

## ENVIRONMENTAL PRODUCT DECLARATION

# JOINT COMPOUND

DRYWALL FINISHING COUNCIL



Joint compound for drywall finishing



The Drywall Finishing Council (DWFC) represents companies who manufacture drywall finishing materials, such as paints and joint compound. The Drywall Finishing Council was founded in 1992 as a small group of manufacturers of drywall finishing materials. Founding members were united by concerns over a lack of industry standards related to both specification and application procedures and a shared commitment to address those issues.

#### Participating Companies:

- Canadian Gypsum Company / SYNKO
- CertainTeed Gypsum
- Continental Building Products
- Magnum Products
- Freeman Products, Inc.
- National Gypsum Company
- Panel Rey SA
- Solid Products
- Southern Wall Products
- United States Gypsum Company
- Westpac Materials








**JOINT PRODUCT**  
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According to ISO 14025

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.



PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Drywall Finishing Council
DECLARATION NUMBER	4787593939.101.1
DECLARED PRODUCT	Drywall Finishing Joint Compound
REFERENCE PCR	UL Part A v1.3 & Part B: Joint compound EPD requirements (2016)
DATE OF ISSUE	November 8, 2017
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications
The PCR review was conducted by:	PCR Review Panel
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This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	 Wade Stout, UL Environment
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This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	 Thomas Gloria, Industrial Ecology Consultants



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Participating Members

This declaration covers a range of joint compound manufactured by participating Drywall Finishing Council (DWFC) members:



Canadian Gypsum Company / SYNKO  
[www.cginc.com](http://www.cginc.com)



Panel Rey SA  
[www.panelrey.com](http://www.panelrey.com)



CertainTeed Gypsum  
[www.certainteed.com](http://www.certainteed.com)



Solid Products  
[www.solidproductsinc.com](http://www.solidproductsinc.com)



Continental Building Products  
[www.continental-bp.com](http://www.continental-bp.com)



Southern Wall Products  
[www.ruco.com](http://www.ruco.com)



Magnum Products  
[www.magnum-products.com](http://www.magnum-products.com)



Freeman Products, Inc.  
[www.freemandrywall.com](http://www.freemandrywall.com)



United States Gypsum Company  
[www.usg.com](http://www.usg.com)



National Gypsum Company  
[www.nationalgypsum.com](http://www.nationalgypsum.com)



Westpac Materials  
[www.westpacmaterials.com](http://www.westpacmaterials.com)

Product System

Product Description

Joint compound, as defined by ASTM C474 and C475, is used along with joint tape to join sheets of drywall by creating a seamless finish. Joint compound is comprised of a blend of minerals. Ready mixed compound is a pre-made form of joint compound that may be used for immediate application without any additional preparation, whereas dry powder compound requires the addition of water prior to installation. All joint compounds are available in lightweight (<12 lb/gal) and conventional weight (>12 lb/gal) options.

Application

Joint compound products are commonly used in commercial, light commercial, institutional, and residential interior applications.

Environment





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**Technical Data**

Product properties for lightweight and conventional ready mixed, as well as lightweight and conventional dry powder, joint compound products can be seen in Table 1.

**Table 1: Joint compound product properties**

Name	Unit	Lightweight Ready Mixed	Conventional Ready Mixed	Lightweight Dry Powder	Conventional Dry Powder
Shrinkage rate (ASTM C474)	%	16.5	19.2	n/a	n/a
Edge and Check Crack Resistance (ASTM C474)	-	Meets requirements			
Microbial resistance (putrefaction) (ASTM C474)	Days	At minimum, no putrefaction in less than four days			

**Placing on the Market / Application Rules**

The products considered in this EPD conform to the following technical specifications.

- ASTM C474 - Standard Test Methods for Joint Treatment Materials for Gypsum Board Construction
- ASTM C475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board

**Properties of Declared Product as Delivered**

The finished ready mixed compounds are delivered ready to apply in volumes ranging from 1 gal. to 5 gal. Dry powder joint compound is typically delivered in 18 lb, 25 lb, or 30 lb weights and requires mixing water be added on site before use.

**Base Materials / Ancillary Materials**

The production of joint compound exclusively uses virgin materials. The average formulation is detailed in Table 2.

**Table 2: Base and ancillary materials in joint compound**

Composition (%)	Lightweight Ready Mixed	Conventional Ready Mixed	Lightweight Dry Powder	Conventional Dry Powder
Accelerator	-	-	0.4	0.3
Attapulgate	1.6	2.0	4.1	3.6
Biocide	0.4	0.1	-	-
Cellulose	0.4	0.2	0.4	0.7
Kaolin	0.8	0.7	-	-
Latex	1.0	0.7	-	-
Limestone	44.9	60.1	28.4	15.2
Perlite	5.8	0.5	-	-
Polymer	1.8	0.4	0.4	2.0
Retarder	-	-	0.4	0.4
Stucco	-	-	56.4	73.7
Talcum	2.8	2.5	-	-
Water	40.1	31.6	-	-
Other additives	0.3	1.3	9.5	4.0





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**Manufacture**

Raw materials, including limestone, perlite, plasticizers, and other modifiers are unloaded and temporarily stored. When needed for production, materials are retrieved from storage, placed into specific batches based on formulation in a dry receiver or hopper, and dry-mixed. In the case of ready mixed formulations, liquid ingredients are added to a wet mixer and mixed with dry products and homogenized until a smooth paste is formed. Following the wet mix cycle the material is checked for quality control and, if necessary, the batch is adjusted to meet finished product specifications. The wet mix is then discharged from mixer to the package filling station, packaged, palletized, and stored. Ready mixed products are packaged either in lined cardboard containers or plastic pails, whereas dry powder products are packaged in paper bags. After being subjected to quality assurance inspections, the packaged product is placed into warehouse storage, and finally shipped to the customer warehouse or job site. A process flow diagram for joint compound is shown in Figure 1.

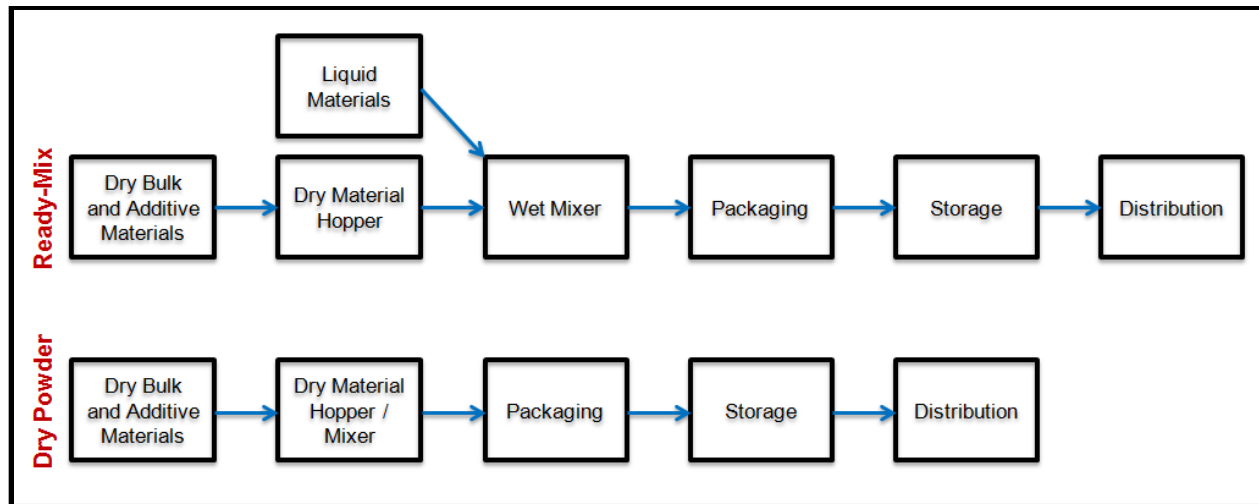


Figure 1: Joint compound manufacturing process flow diagram

**Environment and Health during Manufacturing**

Where there is potential for airborne exposure in excess of applicable limits determined via Industrial Hygiene testing/monitoring, wear NIOSH (National Institute for Occupational Safety and Health) approved respiratory protection.

**Product Processing / Installation**

The functional unit specifies the joint compound be applied to a GA-214 Level 4 finish. A Level 4 finish is defined as:

*“All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Two (2) separate coats of joint compound shall be applied over all flat joints and one (1) separate coat of joint compound shall be applied over interior angles. Fastener heads and accessories shall be covered with three (3) separate coats of joint compound. The surface shall be smooth and free of tool marks and ridges.” (Gypsum Association, 2015).*







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## Packaging

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The finished joint compounds are typically packaged in plastic pails, plastic-lined cardboard boxes, or paper bags, and are then palletized and shipped to the customer. It is assumed 60% of the wooden pallets get reused while the remainder go to landfill.

## Conditions of Use

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“All gypsum board surfaces shall be sound, and remain dry. All construction debris, sanding dust or other surface contaminants shall be removed prior to application of interior finishing materials. The interior space shall be maintained at a minimum temperature of 50°F (10°C) for at least 48 hours prior to the application of interior finishing materials. The interior space shall be environmentally controlled at a minimum temperature of 50°F (10°C) during and after the application(s) of interior finishing materials, and ideally, jobsite controlled under occupancy environmental conditions throughout the finishing process until occupancy” (DWFC, 2011).

## Environment and Health during Installation

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Dust emissions from both joint compound and non-joint compound sources are present during drywall finishing activities and can vary significantly. While the silica content of a particular joint compound product is dictated by the raw materials used by the manufacturer, an employee’s potential exposure to dust at the jobsite is ultimately dependent on the jobsite conditions and the other construction activities in progress at the time the workforce is operating. It is recommended that the user review the specific product Safety Data Sheet (SDS) from the manufacturer to determine product-specific silica levels. Additionally, workers should protect themselves by wearing the recommended Personal Protection Equipment (PPE). This requires the employer to implement a respiratory protection program that is specific to the current work site. See OSHA 1910.134 and ANSI Z88.2 for details on respiratory protection requirements (OSHA, 2006; ANSI/ASSE, 2015). Specific to joint compound, on-site finishing methods can influence the amount of airborne dust directly attributed to a joint compound product.

“The silica exposures of drywall finishing employees are typically well below allowable limits, primarily due to the low silica content of joint compounds. Nonetheless, drywall joint compounds may contain varying amounts of silica and drywall finishing employees can be overexposed in certain circumstances” (OSHA, 2009, p. 51).

Manufacturers can test their products under “controlled conditions” but the specifics of the tests used will vary depending on the third party testing facility, and there is no requirement to do so given their lack of control over installation methods. Ultimately the burden of protection falls on the installation employer. More information on sampling methods for manufacturers or employers can be found in Appendix A of OSHA’s Occupational Exposure to Respirable Crystalline Silica rule (OSHA, 2017a).

It should be noted that OSHA’s updated crystalline silica rule does not include drywall finishing as a task in Table 1 for which specified exposure control methods have to be implemented (OSHA, 2017b).

## Reference Service Life

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The building reference service life (RSL) is taken to be 75 years. Joint compound is expected to last as long as the building itself; therefore, the product will also have an RSL of 75 years.

## Extraordinary Effects

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As joint compound is part of a larger assembly, fire requirements are specified by GA 600, Fire Resistance Design Manual published by the Gypsum Association.





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**Re-Use Phase**

Joint compound is removed from the building at end-of-life and is assumed to not be reused at this point.

**Disposal**

Once the joint compound is removed from the building at end-of-life, the waste is assumed to be transported 20 miles to a landfill. Cured joint compound is inert and not considered as hazardous waste; therefore no adverse environmental or human health impacts are anticipated from the disposal of joint compound, nor does the Resource Conservation and Recovery Act apply.

**Life Cycle Assessment Calculation**

**Functional Unit**

This declaration refers to the functional unit as prescribed by the PCR. The functional unit is defined as “100 m<sup>2</sup> of covered substrate considering an installation scenario as defined by a GA-214 Level 4 finish with the quantity adjusted for the measured shrinkage (testing per ASTM C474) for a service life of 75 years.” The following equation is used to calculate the functional unit (note that the formula calculates per 1000 ft<sup>2</sup> but the functional unit is 100 m<sup>2</sup>, all values are presented per functional unit):

$$\text{Functional Unit (gal/msf)} = 10.1 \text{ gal/msf} \div [(1 - \text{shrinkage rate}) \times (1 - \text{installation waste})]$$

**Table 3: Functional unit and relevant joint compound properties**

Name	Unit	Lightweight Ready Mixed	Conventional Ready Mixed	Lightweight Dry Powder	Conventional Dry Powder
Functional unit	kg/100m <sup>2</sup>	58.9	88.6	53.8	72.1
Volume	L/100m <sup>2</sup> (gal/100m <sup>2</sup> )	50.8 (13.4)	54.0 (14.3)	42.7 (11.3)	42.4 (11.2)
Density (wet, ASTM C474)	kg/L (lb/gal)	1.16 (9.68)	1.64 (13.7)	1.26 (10.6)	1.70 (14.2)
Shrinkage rate (ASTM C474)	%	16.5	19.2	n/a	n/a

**System Boundary**

The analysis includes raw material sourcing and extraction, manufacturing, installation, use, and end-of-life (EoL) disposal of joint compound. The included life cycle stages are summarized in, according to the EN15804 standard referenced in the PCR.





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Table 4: System boundary

Product Stage			Construction Process Stage		Use Stage							End-of-Life Stage				Beyond System Boundary
Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction	Transport	Waste processing	Disposal	Reuse, recovery or recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X = declared module; MND = module not declared

Estimates and Assumptions

Each manufacturer identified one or more manufacturing sites to be representative of its manufacturing inputs and outputs. Manufacturers also reported total joint compound production at each of their production facilities. The material and energy inputs and outputs were modeled according to data provided by the representative site, while the electricity grid and natural gas mix were chosen based on the locations of each manufacturer’s production facilities. Further granularity of raw material, energy consumption, and waste data for additional locations may alter the results of this study.

When possible, energy consumption data on joint compound production were collected via sub-metering. However, when not feasible, energy consumption was allocated to the joint compound productions by mass.

Material inbound transport distances, product outbound distances, packaging details, and installation details, are calculated based on estimations from participating DWFC companies.

Cut-off Criteria

The cut-off criteria for including or excluding materials, energy and emissions data of the study are as follows:

- ✓ Mass – If a flow is less than 1% of the cumulative mass of the model it may be excluded, providing its environmental relevance is not a concern.
- ✓ Energy – If a flow is less than 1% of the cumulative energy of the model it may be excluded, providing its environmental relevance is not a concern.
- ✓ Environmental relevance – If a flow meets the above criteria for exclusion, yet is thought to potentially have a significant environmental impact, it was included. Material flows which leave the system (emissions) and whose environmental impact is greater than 1% of the whole impact of an impact category that has been considered in the assessment must be covered. This judgment was made based on experience and documented as necessary.







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Packaging of raw materials (e.g. pallets, totes, super-sacks) are excluded as they represent less than 1% of the cumulative mass and are not environmentally relevant.

**Background Data**

Background data for upstream and downstream data are representative of the years 2010 - 2015 and were obtained from the GaBi 2016 databases (thinkstep, 2016).

**Data Quality**

A variety of tests and checks were performed throughout the project to ensure high quality of the completed LCA. Checks included an extensive review of the LCA model as well as the background data used.

Data included first-hand industry data as well and data from literature review in combination with consistent background life cycle inventory information from the GaBi 2016 databases. The data are representative of member companies' joint compound production data for the year 2015.

**Period under Review**

Data are representative of manufacturing during 2015.

**Allocation**

Where manufacturing inputs, such as electricity use, were not sub-metered, they were allocated by mass to the respective products produced at each facility. No other co-product allocation occurs in the product foreground system.

**Comparability**

A comparison or evaluation of EPD data is only possible if all data sets to be compared are 1) created according to EN 15804 and 2) are considered in a whole building context or utilize identical defined use stage scenarios. Comparisons are only allowable when EPDs report cradle-to-grave information using a functional unit. Refer to section 5.3 of EN 15804 for further information.

**LCA: Scenarios and additional technical information**

As product base materials consist largely of silica materials, different product packaging types play a significant role in the overall impact of the product, depending on the packaging to product mass ratio as well as the packaging material composition. Therefore, results are presented for ready mixed conventional and lightweight as well as dry conventional and lightweight products in various packaging scenarios.

Additionally, the technical information in the following tables represents a basis for the declared modules.

**Table 5: Transport to the building site (A4) - Ready mixed, lightweight**

Name	Unit	3.5 gal Pail	3.5 gal Cardboard	4.5 gal Pail	4.5 gal Cardboard
Fuel economy, outbound transport	L/100 km	41.6	41.6	41.6	41.6
Fuel economy, jobsite transport	L/100 km	19.6	19.6	19.6	19.6
Outbound distance	km	446	446	446	446





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Name	Unit	3.5 gal Pail	3.5 gal Cardboard	4.5 gal Pail	4.5 gal Cardboard
Jobsite distance	km	32.2	32.2	32.2	32.2
Liters of fuel, total	L	0.909	0.817	0.800	0.766
Capacity utilization (mass)	%	75	87	95	100
Density	kg/m <sup>3</sup>	9.68	9.68	9.68	9.68
Capacity utilization (volume)	-	0.44	0.38	0.42	0.33

Table 6: Transport to the building site (A4) - Ready mixed, conventional

Name	Unit	3.5 gal Pail	3.5 gal Cardboard	4.5 gal Pail	4.5 gal Cardboard
Fuel economy, outbound transport	L/100 km	41.6	41.6	41.6	41.6
Fuel economy, jobsite transport	L/100 km	19.6	19.6	19.6	19.6
Outbound distance	km	523	523	523	523
Jobsite distance	km	32.2	32.2	32.2	32.2
Liters of fuel, total	L	1.44	1.37	1.34	1.30
Capacity utilization (mass)	%	83	89	94	100
Density	kg/m <sup>3</sup>	13.7	13.7	13.7	13.7
Capacity utilization (volume)	-	0.37	0.34	0.35	0.30

Table 7: Transport to the building site (A4) - Dry Powder

Name	Unit	18 lb, Lightweight	25 lb, Conventional
Fuel economy, outbound transport	L/100 km	41.6	41.6
Fuel economy, jobsite transport	L/100 km	19.6	19.6
Outbound distance	km	380	341
Jobsite distance	km	32.2	32.2
Liters of fuel, total	L	0.372	0.588
Capacity utilization (mass)	%	100	94

Table 8: Installation to the building (A5)

Name	Unit	Lightweight Ready Mixed	Conventional Ready Mixed	Lightweight Dry Powder	Conventional Dry Powder
Auxiliary materials	kg	-	-	-	-
Water consumption	L	-	-	21.4	17.3
Other resources	kg	-	-	-	-
Electricity consumption	kWh	-	-	-	-
Other energy carriers	MJ	-	-	-	-
Material loss	kg	1.33	1.89	1.45	1.95





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Name	Unit	Lightweight Ready Mixed	Conventional Ready Mixed	Lightweight Dry Powder	Conventional Dry Powder
Packaging waste to landfill					
3.5 gal cardboard		1.94	2.10	-	-
3.5 gal pail		3.52	3.65	-	-
4.5 gal cardboard	kg	1.91	2.28	-	-
4.5 gal pail		3.16	3.40	-	-
18 lb. paper bag		-	-	0.599	-
25 lb. paper bag		-	-	-	0.390
Airborne dust	µg/m <sup>3</sup>	Varies by product and installer			
Chemical emissions	µg/m <sup>3</sup>	Voluntary test, no average available			
VOC	g/L	<5	<5	-	-

Table 9: End of life (C1-C4)

Name	Unit	Lightweight Ready Mixed	Conventional Ready Mixed	Lightweight Dry Powder	Conventional Dry Powder
Collected as mixed construction waste	kg	58.9	88.6	53.8	72.1
Landfill	kg	58.9	88.6	53.8	72.1

Table 10: Reuse, recovery, and/or recycling potentials (D) - Ready mixed, lightweight

Name	Unit	3.5 gal Pail	3.5 gal Cardboard	4.5 gal Pail	4.5 gal Cardboard
Net energy benefit from energy recovery from waste treatment declared as exported energy in D (due to packaging disposal)	MJ	0.409	0.898	0.294	0.825

Table 11: Reuse, recovery, and/or recycling potentials (D) - Ready mixed, conventional

Name	Unit	3.5 gal Pail	3.5 gal Cardboard	4.5 gal Pail	4.5 gal Cardboard
Net energy benefit from energy recovery from waste treatment declared as exported energy in D	MJ	0.453	1.07	0.357	1.03

Table 12: Reuse, recovery, and/or recycling potentials (D) - Dry powder

Name	Unit	18 lb, Lightweight	25 lb, Conventional
Net energy benefit from energy recovery from waste treatment declared as exported energy in D	MJ	0.405	0.503





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LCA: Results

Ready mixed lightweight results, 3.5 gal pail

IMPACT ASSESSMENT							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
GWP	[kg CO <sub>2</sub> - Eq.]	3.05E+01	2.84E+00	6.40E-02	1.76E-01	2.99E+00	-1.87E-01
ODP	[kg CFC 11 - Eq.]	5.09E-09	2.49E-11	1.25E-12	1.54E-12	4.86E-11	-2.22E-11
AP	[kg SO <sub>2</sub> -Eq.]	8.39E-02	1.19E-02	2.98E-04	8.07E-04	1.52E-02	-7.18E-04
EP	[kg N-Eq.]	8.14E-03	1.16E-03	1.73E-05	7.65E-05	1.75E-03	-5.65E-05
POCP	[kg O <sub>3</sub> -Eq.]	1.59E+00	3.71E-01	6.04E-03	2.55E-02	2.31E-01	-1.62E-02
ADPF	[MJ surplus energy]	7.75E+01	5.39E+00	1.24E-01	3.35E-01	4.64E+00	-1.56E-01
RESOURCE USE							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
PERE	[MJ, LHV]	4.76E+01	6.64E-01	5.96E-02	4.12E-02	2.35E+00	-1.60E+01
PERM	[MJ, LHV]	2.31E+01	-	-	-	-	-
PERT	[MJ, LHV]	7.08E+01	6.64E-01	5.96E-02	4.12E-02	2.35E+00	-1.60E+01
PENRE	[MJ, LHV]	5.01E+02	4.02E+01	9.86E-01	2.49E+00	3.71E+01	-2.29E+00
PENRM	[MJ, LHV]	1.61E+02	-	-	-	-	-
PENRT	[MJ, LHV]	6.62E+02	4.02E+01	9.86E-01	2.49E+00	3.71E+01	-2.29E+00
SM	[kg]	-	-	-	-	-	-
RSF	[MJ, LHV]	-	-	-	-	-	-
NRSF	[MJ, LHV]	-	-	-	-	-	-
FW	[m <sup>3</sup> ]	3.28E+02	8.14E+00	1.55E-01	5.05E-01	5.82E+00	-7.13E-01
OUTPUT FLOWS AND WASTE CATEGORIES							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
HWD	[kg]	6.76E-06	5.10E-08	1.85E-09	3.16E-09	7.10E-08	-8.26E-08
NHWD	[kg]	1.03E+00	1.41E-03	1.33E+00	8.76E-05	5.32E+01	-2.56E-03
RWD	[kg]	1.70E-02	8.45E-05	9.54E-06	5.24E-06	3.77E-04	-1.24E-04
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	6.59E-01	-	-	-
MER	[kg]	-	-	-	-	-	-
EE	[MJ, LHV]	-	-	4.09E-01	-	-	-

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPF = Abiotic depletion potential for fossil resources; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM= Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy





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Ready mixed lightweight results, 3.5 gal cardboard

IMPACT ASSESSMENT							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
GWP	[kg CO <sub>2</sub> - Eq.]	2.07E+01	2.56E+00	6.40E-02	1.70E-01	3.62E+00	-2.26E-01
ODP	[kg CFC 11 - Eq.]	3.20E-09	2.24E-11	1.25E-12	1.49E-12	4.69E-11	-4.47E-11
AP	[kg SO <sub>2</sub> -Eq.]	6.10E-02	1.03E-02	2.98E-04	7.78E-04	1.71E-02	-7.50E-04
EP	[kg N-Eq.]	8.00E-03	1.02E-03	1.73E-05	7.36E-05	1.79E-03	-5.18E-05
POCP	[kg O <sub>3</sub> -Eq.]	1.24E+00	3.19E-01	6.04E-03	2.45E-02	2.28E-01	-1.41E-02
ADP	[MJ surplus energy]	4.12E+01	4.85E+00	1.24E-01	3.22E-01	4.48E+00	-1.92E-01
RESOURCE USE							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
PERE	[MJ, LHV]	2.63E+01	5.97E-01	5.96E-02	3.97E-02	2.27E+00	-1.18E+01
PERM	[MJ, LHV]	4.84E+01	-	-	-	-	-
PERT	[MJ, LHV]	7.47E+01	5.97E-01	5.96E-02	3.97E-02	2.27E+00	-1.18E+01
PENRE	[MJ, LHV]	3.48E+02	3.61E+01	9.86E-01	2.40E+00	3.58E+01	-2.97E+00
PENRM	[MJ, LHV]	1.28E+02	-	-	-	-	-
PENRT	[MJ, LHV]	3.61E+02	3.61E+01	9.86E-01	2.40E+00	3.58E+01	-2.97E+00
SM	[kg]	-	-	-	-	-	-
RSF	[MJ, LHV]	-	-	-	-	-	-
NRSF	[MJ, LHV]	-	-	-	-	-	-
FW	[m <sup>3</sup> ]	2.88E+02	7.32E+00	1.55E-01	4.86E-01	5.76E+00	-9.07E-01
OUTPUT FLOWS AND WASTE CATEGORIES							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
HWD	[kg]	7.45E-06	4.59E-08	1.85E-09	3.05E-09	6.85E-08	-6.13E-08
NHWD	[kg]	9.91E-01	1.27E-03	1.33E+00	8.44E-05	5.10E+01	-2.25E-03
RWD	[kg]	1.06E-02	7.60E-05	9.54E-06	5.05E-06	3.64E-04	-1.84E-04
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	4.83E-01	-	-	-
MER	[kg]	-	-	-	-	-	-
EE	[MJ, LHV]	-	-	8.98E-01	-	-	-

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPF = Abiotic depletion potential for fossil resources; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM= Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy





JOINT COMPOUND  
DRYWALL JOINT COMPOUND

According to ISO 14025

Ready mixed lightweight results, 4.5 gal pail

IMPACT ASSESSMENT							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
GWP	[kg CO <sub>2</sub> - Eq.]	2.94E+01	2.50E+00	6.40E-02	1.74E-01	2.79E+00	-1.35E-01
ODP	[kg CFC 11 - Eq.]	4.88E-09	2.19E-11	1.25E-12	1.52E-12	4.81E-11	-1.60E-11
AP	[kg SO <sub>2</sub> -Eq.]	8.05E-02	9.83E-03	2.98E-04	7.95E-04	1.43E-02	-5.17E-04
EP	[kg N-Eq.]	7.94E-03	9.82E-04	1.73E-05	7.53E-05	1.58E-03	-4.07E-05
POCP	[kg O <sub>3</sub> -Eq.]	1.53E+00	3.03E-01	6.04E-03	2.51E-02	2.26E-01	-1.17E-02
ADP	[MJ surplus energy]	7.30E+01	4.75E+00	1.24E-01	3.30E-01	4.59E+00	-1.12E-01
RESOURCE USE							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
PERE	[MJ, LHV]	4.22E+01	5.84E-01	5.96E-02	4.06E-02	2.32E+00	-1.15E+01
PERM	[MJ, LHV]	1.77E+01	-	-	-	-	-
PERT	[MJ, LHV]	5.99E+01	5.84E-01	5.96E-02	4.06E-02	2.32E+00	-1.15E+01
PENRE	[MJ, LHV]	4.80E+02	3.54E+01	9.86E-01	2.45E+00	3.66E+01	-1.65E+00
PENRM	[MJ, LHV]	1.45E+02	-	-	-	-	-
PENRT	[MJ, LHV]	6.25E+02	3.54E+01	9.86E-01	2.45E+00	3.66E+01	-1.65E+00
SM	[kg]	-	-	-	-	-	-
RSF	[MJ, LHV]	-	-	-	-	-	-
NRSF	[MJ, LHV]	-	-	-	-	-	-
FW	[m <sup>3</sup> ]	3.21E+02	7.16E+00	1.55E-01	4.97E-01	5.72E+00	-5.14E-01
OUTPUT FLOWS AND WASTE CATEGORIES							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
HWD	[kg]	6.69E-06	4.49E-08	1.85E-09	3.12E-09	7.02E-08	-5.95E-08
NHWD	[kg]	1.02E+00	1.24E-03	1.33E+00	8.63E-05	5.26E+01	-1.84E-03
RWD	[kg]	1.63E-02	7.44E-05	9.54E-06	5.16E-06	3.73E-04	-8.90E-05
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	4.74E-01	-	-	-
MER	[kg]	-	-	-	-	-	-
EE	[MJ, LHV]	-	-	2.94E-01	-	-	-

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPF = Abiotic depletion potential for fossil resources; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM= Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy







JOINT COMPOUND  
DRYWALL JOINT COMPOUND

According to ISO 14025

Ready mixed lightweight results, 4.5 gal cardboard

IMPACT ASSESSMENT							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
GWP	[kg CO <sub>2</sub> - Eq.]	2.06E+01	2.40E+00	6.40E-02	1.69E-01	3.50E+00	-1.96E-01
ODP	[kg CFC 11 - Eq.]	3.19E-09	2.10E-11	1.25E-12	1.48E-12	4.68E-11	-4.07E-11
AP	[kg SO <sub>2</sub> -Eq.]	6.06E-02	9.27E-03	2.98E-04	7.73E-04	1.66E-02	-6.37E-04
EP	[kg N-Eq.]	7.94E-03	9.31E-04	1.73E-05	7.32E-05	1.73E-03	-4.31E-05
POCP	[kg O <sub>3</sub> -Eq.]	1.23E+00	2.85E-01	6.04E-03	2.44E-02	2.26E-01	-1.16E-02
ADP	[MJ surplus energy]	4.10E+01	4.55E+00	1.24E-01	3.21E-01	4.47E+00	-1.67E-01
RESOURCE USE							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
PERE	[MJ, LHV]	2.41E+01	5.60E-01	5.96E-02	3.94E-02	2.26E+00	-9.45E+00
PERM	[MJ, LHV]	4.47E+01	-	-	-	-	-
PERT	[MJ, LHV]	6.87E+01	5.60E-01	5.96E-02	3.94E-02	2.26E+00	-9.45E+00
PENRE	[MJ, LHV]	3.47E+02	3.39E+01	9.86E-01	2.39E+00	3.57E+01	-2.59E+00
PENRM	[MJ, LHV]	1.25E+01	-	-	-	-	-
PENRT	[MJ, LHV]	3.59E+02	3.39E+01	9.86E-01	2.39E+00	3.57E+01	-2.59E+00
SM	[kg]	-	-	-	-	-	-
RSF	[MJ, LHV]	-	-	-	-	-	-
NRSF	[MJ, LHV]	-	-	-	-	-	-
FW	[m <sup>3</sup> ]	2.87E+02	6.86E+00	1.55E-01	4.84E-01	5.72E+00	-7.92E-01
OUTPUT FLOWS AND WASTE CATEGORIES							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
HWD	[kg]	7.40E-06	4.30E-08	1.85E-09	3.03E-09	6.83E-08	-4.90E-08
NHWD	[kg]	9.88E-01	1.19E-03	1.33E+00	8.39E-05	5.09E+01	-1.86E-03
RWD	[kg]	1.06E-02	7.13E-05	9.54E-06	5.02E-06	3.63E-04	-1.63E-04
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	3.85E-01	-	-	-
MER	[kg]	-	-	-	-	-	-
EE	[MJ, LHV]	-	-	8.25E-01	-	-	-

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPF = Abiotic depletion potential for fossil resources; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM= Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy





JOINT COMPOUND  
DRYWALL JOINT COMPOUND

According to ISO 14025

Ready mixed conventional results, 3.5 gal pail

IMPACT ASSESSMENT							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
GWP	[kg CO <sub>2</sub> - Eq.]	3.43E+01	4.51E+00	9.08E-02	2.46E-01	4.00E+00	-2.07E-01
ODP	[kg CFC 11 - Eq.]	6.53E-09	3.94E-11	1.78E-12	2.15E-12	6.80E-11	-2.46E-11
AP	[kg SO <sub>2</sub> -Eq.]	9.84E-02	1.85E-02	4.23E-04	1.13E-03	2.00E-02	-7.97E-04
EP	[kg N-Eq.]	9.00E-03	1.82E-03	2.46E-05	1.07E-04	2.06E-03	-6.27E-05
POCP	[kg O <sub>3</sub> -Eq.]	1.83E+00	5.75E-01	8.57E-03	3.55E-02	3.19E-01	-1.80E-02
ADP	[MJ surplus energy]	7.90E+01	8.55E+00	1.76E-01	4.67E-01	6.49E+00	-1.73E-01
RESOURCE USE							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
PERE	[MJ, LHV]	7.31E+01	1.05E+00	8.46E-02	5.74E-02	3.28E+00	-1.78E+01
PERM	[MJ, LHV]	2.50E+01	-	-	-	-	-
PERT	[MJ, LHV]	9.81E+01	1.05E+00	8.46E-02	5.74E-02	3.28E+00	-1.78E+01
PENRE	[MJ, LHV]	5.35E+02	6.36E+01	1.40E+00	3.47E+00	5.18E+01	-2.54E+00
PENRM	[MJ, LHV]	1.78E+02	-	-	-	-	-
PENRT	[MJ, LHV]	7.12E+02	6.36E+01	1.40E+00	3.47E+00	5.18E+01	-2.54E+00
SM	[kg]	-	-	-	-	-	-
RSF	[MJ, LHV]	-	-	-	-	-	-
NRSF	[MJ, LHV]	-	-	-	-	-	-
FW	[m <sup>3</sup> ]	3.63E+02	1.29E+01	2.20E-01	7.04E-01	8.10E+00	-7.91E-01
OUTPUT FLOWS AND WASTE CATEGORIES							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
HWD	[kg]	8.08E-06	8.08E-08	2.62E-09	4.41E-09	9.92E-08	-9.16E-08
NHWD	[kg]	1.70E+00	2.24E-03	1.89E+00	1.22E-04	7.44E+01	-2.84E-03
RWD	[kg]	2.21E-02	1.34E-04	1.35E-05	7.31E-06	5.27E-04	-1.37E-04
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	7.29E-01	-	-	-
MER	[kg]	-	-	-	-	-	-
EE	[MJ, LHV]	-	-	4.53E-01	-	-	-

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPF = Abiotic depletion potential for fossil resources; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM= Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy





JOINT COMPOUND  
DRYWALL JOINT COMPOUND

According to ISO 14025

Ready mixed conventional results, 3.5 gal cardboard

IMPACT ASSESSMENT							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
GWP	[kg CO <sub>2</sub> - Eq.]	2.42E+01	4.28E+00	9.08E-02	2.40E-01	4.82E+00	-2.84E-01
ODP	[kg CFC 11 - Eq.]	4.56E-09	3.74E-11	1.78E-12	2.10E-12	6.65E-11	-5.35E-11
AP	[kg SO <sub>2</sub> -Eq.]	7.49E-02	1.72E-02	4.23E-04	1.10E-03	2.26E-02	-9.64E-04
EP	[kg N-Eq.]	8.95E-03	1.71E-03	2.46E-05	1.04E-04	2.20E-03	-6.79E-05
POCP	[kg O <sub>3</sub> -Eq.]	1.49E+00	5.34E-01	8.57E-03	3.47E-02	3.18E-01	-1.86E-02
ADP	[MJ surplus energy]	4.10E+01	8.11E+00	1.76E-01	4.56E-01	6.34E+00	-2.42E-01
RESOURCE USE							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
PERE	[MJ, LHV]	5.30E+01	9.98E-01	8.46E-02	5.61E-02	3.21E+00	-1.61E+01
PERM	[MJ, LHV]	5.64E+01	-	-	-	-	-
PERT	[MJ, LHV]	1.09E+02	9.98E-01	8.46E-02	5.61E-02	3.21E+00	-1.61E+01
PENRE	[MJ, LHV]	3.77E+02	6.04E+01	1.40E+00	3.39E+00	5.07E+01	-3.70E+00
PENRM	[MJ, LHV]	2.18E+01	-	-	-	-	-
PENRT	[MJ, LHV]	3.99E+02	6.04E+01	1.40E+00	3.39E+00	5.07E+01	-3.70E+00
SM	[kg]	-	-	-	-	-	-
RSF	[MJ, LHV]	-	-	-	-	-	-
NRSF	[MJ, LHV]	-	-	-	-	-	-
FW	[m <sup>3</sup> ]	3.22E+02	1.22E+01	2.20E-01	6.88E-01	8.10E+00	-1.14E+00
OUTPUT FLOWS AND WASTE CATEGORIES							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
HWD	[kg]	8.88E-06	7.67E-08	2.62E-09	4.31E-09	9.70E-08	-8.34E-08
NHWD	[kg]	1.66E+00	2.12E-03	1.89E+00	1.19E-04	7.23E+01	-2.97E-03
RWD	[kg]	1.54E-02	1.27E-04	1.35E-05	7.14E-06	5.15E-04	-2.26E-04
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	6.59E-01	-	-	-
MER	[kg]	-	-	-	-	-	-
EE	[MJ, LHV]	-	-	1.07E+00	-	-	-

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPF = Abiotic depletion potential for fossil resources; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM= Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy





JOINT COMPOUND  
DRYWALL JOINT COMPOUND

According to ISO 14025

Ready mixed conventional results, 4.5 gal pail

IMPACT ASSESSMENT							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
GWP	[kg CO <sub>2</sub> - Eq.]	3.33E+01	4.21E+00	9.08E-02	2.44E-01	3.84E+00	-1.63E-01
ODP	[kg CFC 11 - Eq.]	6.38E-09	3.68E-11	1.78E-12	2.13E-12	6.75E-11	-1.94E-11
AP	[kg SO <sub>2</sub> -Eq.]	9.60E-02	1.66E-02	4.23E-04	1.12E-03	1.92E-02	-6.28E-04
EP	[kg N-Eq.]	8.85E-03	1.66E-03	2.46E-05	1.06E-04	1.93E-03	-4.95E-05
POCP	[kg O <sub>3</sub> -Eq.]	1.79E+00	5.14E-01	8.57E-03	3.52E-02	3.14E-01	-1.42E-02
ADP	[MJ surplus energy]	7.58E+01	7.98E+00	1.76E-01	4.63E-01	6.45E+00	-1.37E-01
RESOURCE USE							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
PERE	[MJ, LHV]	6.86E+01	9.82E-01	8.46E-02	5.70E-02	3.26E+00	-1.40E+01
PERM	[MJ, LHV]	2.04E+01	-	-	-	-	-
PERT	[MJ, LHV]	8.90E+01	9.82E-01	8.46E-02	5.70E-02	3.26E+00	-1.40E+01
PENRE	[MJ, LHV]	5.20E+02	5.94E+01	1.40E+00	3.45E+00	5.15E+01	-2.00E+00
PENRM	[MJ, LHV]	1.66E+02	-	-	-	-	-
PENRT	[MJ, LHV]	6.86E+02	5.94E+01	1.40E+00	3.45E+00	5.15E+01	-2.00E+00
SM	[kg]	-	-	-	-	-	-
RSF	[MJ, LHV]	-	-	-	-	-	-
NRSF	[MJ, LHV]	-	-	-	-	-	-
FW	[m <sup>3</sup> ]	3.58E+02	1.20E+01	2.20E-01	6.98E-01	8.03E+00	-6.24E-01
OUTPUT FLOWS AND WASTE CATEGORIES							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
HWD	[kg]	8.02E-06	7.54E-08	2.62E-09	4.37E-09	9.86E-08	-7.23E-08
NHWD	[kg]	1.69E+00	2.09E-03	1.89E+00	1.21E-04	7.40E+01	-2.24E-03
RWD	[kg]	2.16E-02	1.25E-04	1.35E-05	7.25E-06	5.24E-04	-1.08E-04
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	5.75E-01	-	-	-
MER	[kg]	-	-	-	-	-	-
EE	[MJ, LHV]	-	-	3.57E-01	-	-	-

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPF = Abiotic depletion potential for fossil resources; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM= Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy





JOINT COMPOUND  
DRYWALL JOINT COMPOUND

According to ISO 14025

Ready mixed conventional results, 4.5 gal cardboard

IMPACT ASSESSMENT							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
GWP	[kg CO <sub>2</sub> - Eq.]	2.44E+01	4.06E+00	9.08E-02	2.40E-01	4.77E+00	-2.52E-01
ODP	[kg CFC 11 - Eq.]	4.57E-09	3.55E-11	1.78E-12	2.10E-12	6.65E-11	-5.12E-11
AP	[kg SO <sub>2</sub> -Eq.]	7.50E-02	1.58E-02	4.23E-04	1.10E-03	2.25E-02	-8.31E-04
EP	[kg N-Eq.]	9.03E-03	1.58E-03	2.46E-05	1.04E-04	2.24E-03	-5.69E-05
POCP	[kg O <sub>3</sub> -Eq.]	1.49E+00	4.86E-01	8.57E-03	3.47E-02	3.18E-01	-1.54E-02
ADP	[MJ surplus energy]	4.15E+01	7.70E+00	1.76E-01	4.55E-01	6.34E+00	-2.15E-01
RESOURCE USE							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
PERE	[MJ, LHV]	4.87E+01	9.47E-01	8.46E-02	5.60E-02	3.21E+00	-1.28E+01
PERM	[MJ, LHV]	5.48E+01	-	-	-	-	-
PERT	[MJ, LHV]	1.04E+02	9.47E-01	8.46E-02	5.60E-02	3.21E+00	-1.28E+01
PENRE	[MJ, LHV]	3.79E+02	5.73E+01	1.40E+00	3.39E+00	5.07E+01	-3.33E+00
PENRM	[MJ, LHV]	2.28E+01	-	-	-	-	-
PENRT	[MJ, LHV]	4.02E+02	5.73E+01	1.40E+00	3.39E+00	5.07E+01	-3.33E+00
SM	[kg]	-	-	-	-	-	-
RSF	[MJ, LHV]	-	-	-	-	-	-
NRSF	[MJ, LHV]	-	-	-	-	-	-
FW	[m <sup>3</sup> ]	3.23E+02	1.16E+01	2.20E-01	6.87E-01	8.09E+00	-1.02E+00
OUTPUT FLOWS AND WASTE CATEGORIES							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
HWD	[kg]	8.92E-06	7.27E-08	2.62E-09	4.30E-09	9.70E-08	-6.62E-08
NHWD	[kg]	1.67E+00	2.02E-03	1.89E+00	1.19E-04	7.24E+01	-2.46E-03
RWD	[kg]	1.54E-02	1.21E-04	1.35E-05	7.13E-06	5.15E-04	-2.07E-04
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	5.22E-01	-	-	-
MER	[kg]	-	-	-	-	-	-
EE	[MJ, LHV]	-	-	1.03E+00	-	-	-

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPF = Abiotic depletion potential for fossil resources; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM= Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy





JOINT COMPOUND  
DRYWALL JOINT COMPOUND

According to ISO 14025

Dry powder lightweight results

IMPACT ASSESSMENT							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
GWP	[kg CO <sub>2</sub> - Eq.]	1.04E+01	1.16E+00	7.43E-02	1.76E-01	2.99E+00	-1.34E-01
ODP	[kg CFC 11 - Eq.]	1.59E-09	1.02E-11	1.40E-12	1.54E-12	4.87E-11	-2.09E-11
AP	[kg SO <sub>2</sub> -Eq.]	4.34E-02	4.47E-03	3.38E-04	8.06E-04	1.39E-02	-4.83E-04
EP	[kg N-Eq.]	6.35E-03	4.50E-04	2.65E-05	7.63E-05	1.06E-03	-3.61E-05
POCP	[kg O <sub>3</sub> -Eq.]	6.95E-01	1.37E-01	6.82E-03	2.54E-02	2.26E-01	-1.01E-02
ADP	[MJ surplus energy]	1.99E+01	2.21E+00	1.41E-01	3.34E-01	4.65E+00	-1.13E-01
RESOURCE USE							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
PERE	[MJ, LHV]	3.22E+01	2.72E-01	6.87E-02	4.11E-02	2.35E+00	-9.44E+00
PERM	[MJ, LHV]	2.72E+01	-	-	-	-	-
PERT	[MJ, LHV]	5.93E+01	2.72E-01	6.87E-02	4.11E-02	2.35E+00	-9.44E+00
PENRE	[MJ, LHV]	1.42E+02	1.64E+01	1.13E+00	2.49E+00	3.72E+01	-1.70E+00
PENRM	[MJ, LHV]	2.68E+01	-	-	-	-	-
PENRT	[MJ, LHV]	1.69E+02	1.64E+01	1.13E+00	2.49E+00	3.72E+01	-1.70E+00
SM	[kg]	-	-	-	-	-	-
RSF	[MJ, LHV]	-	-	-	-	-	-
NRSF	[MJ, LHV]	-	-	-	-	-	-
FW	[m <sup>3</sup> ]	1.72E+02	3.33E+00	2.16E+01	5.04E-01	5.83E+00	-5.25E-01
OUTPUT FLOWS AND WASTE CATEGORIES							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
HWD	[kg]	2.27E-04	2.08E-08	1.94E-09	3.16E-09	7.12E-08	-4.88E-08
NHWD	[kg]	3.92E-01	5.78E-04	1.46E+00	8.74E-05	5.33E+01	-1.61E-03
RWD	[kg]	5.05E-03	3.46E-05	1.12E-05	5.23E-06	3.78E-04	-9.82E-05
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	3.87E-01	-	-	-
MER	[kg]	-	-	-	-	-	-
EE	[MJ, LHV]	-	-	4.05E-01	-	-	-

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPF = Abiotic depletion potential for fossil resources; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM= Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy







JOINT COMPOUND  
DRYWALL JOINT COMPOUND

According to ISO 14025

Dry powder conventional results

IMPACT ASSESSMENT							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
GWP	[kg CO <sub>2</sub> - Eq.]	1.75E+01	1.84E+00	9.74E-02	2.36E-01	3.94E+00	-1.80E-01
ODP	[kg CFC 11 - Eq.]	2.68E-09	1.61E-11	1.86E-12	2.06E-12	6.52E-11	-2.63E-11
AP	[kg SO <sub>2</sub> -Eq.]	5.07E-02	7.14E-03	4.47E-04	1.08E-03	1.82E-02	-6.61E-04
EP	[kg N-Eq.]	1.15E-02	7.17E-04	3.16E-05	1.02E-04	1.32E-03	-5.01E-05
POCP	[kg O <sub>3</sub> -Eq.]	1.15E+00	2.20E-01	9.03E-03	3.40E-02	3.01E-01	-1.41E-02
ADP	[MJ surplus energy]	3.41E+01	3.49E+00	1.86E-01	4.47E-01	6.23E+00	-1.52E-01
RESOURCE USE							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
PERE	[MJ, LHV]	4.00E+01	4.30E-01	9.03E-02	5.50E-02	3.15E+00	-1.34E+01
PERM	[MJ, LHV]	4.05E+01	-	-	-	-	-
PERT	[MJ, LHV]	8.04E+01	4.30E-01	9.03E-02	5.50E-02	3.15E+00	-1.34E+01
PENRE	[MJ, LHV]	2.34E+02	2.60E+01	1.49E+00	3.33E+00	4.97E+01	-2.26E+00
PENRM	[MJ, LHV]	5.34E+01	-	-	-	-	-
PENRT	[MJ, LHV]	2.88E+02	2.60E+01	1.49E+00	3.33E+00	4.97E+01	-2.26E+00
SM	[kg]	-	-	-	-	-	-
RSF	[MJ, LHV]	-	-	-	-	-	-
NRSF	[MJ, LHV]	-	-	-	-	-	-
FW	[m <sup>3</sup> ]	3.65E+02	5.27E+00	1.76E+01	6.74E-01	7.80E+00	-7.01E-01
OUTPUT FLOWS AND WASTE CATEGORIES							
Parameter	Unit	A1-A3	A4	A5	C2	C4	D
HWD	[kg]	5.34E-04	3.30E-08	2.64E-09	4.22E-09	9.52E-08	-6.93E-08
NHWD	[kg]	7.18E-01	9.14E-04	1.96E+00	1.17E-04	7.14E+01	-2.24E-03
RWD	[kg]	8.68E-03	5.47E-05	1.46E-05	7.00E-06	5.06E-04	-1.28E-04
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	5.49E-01	-	-	-
MER	[kg]	-	-	-	-	-	-
EE	[MJ, LHV]	-	-	5.03E-01	-	-	-

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPF = Abiotic depletion potential for fossil resources; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM= Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy





JOINT COMPOUND  
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LCA: Interpretation

Figure 2 and Figure 3 below show the relative impacts of the declared modules for ready mixed, lightweight joint compound in 3.5 gallon HDPE pail and cardboard packaging, to demonstrate the difference between packaging options for the ready mixed products. It's important to note relative packaging material contributions (A3) in the pail scenario, as it represents a significant portion of the overall impacts, and a much higher impact than the cardboard scenario. The majority of burdens for categories fall within modules A1-A3, due to the impacts associated with raw material supply and manufacturing, with the exception of POCP, where transportation modules (A2, A4) account for nearly half of the impact. Module D represents credits from energy recovered from landfilling biodegradable packaging materials.

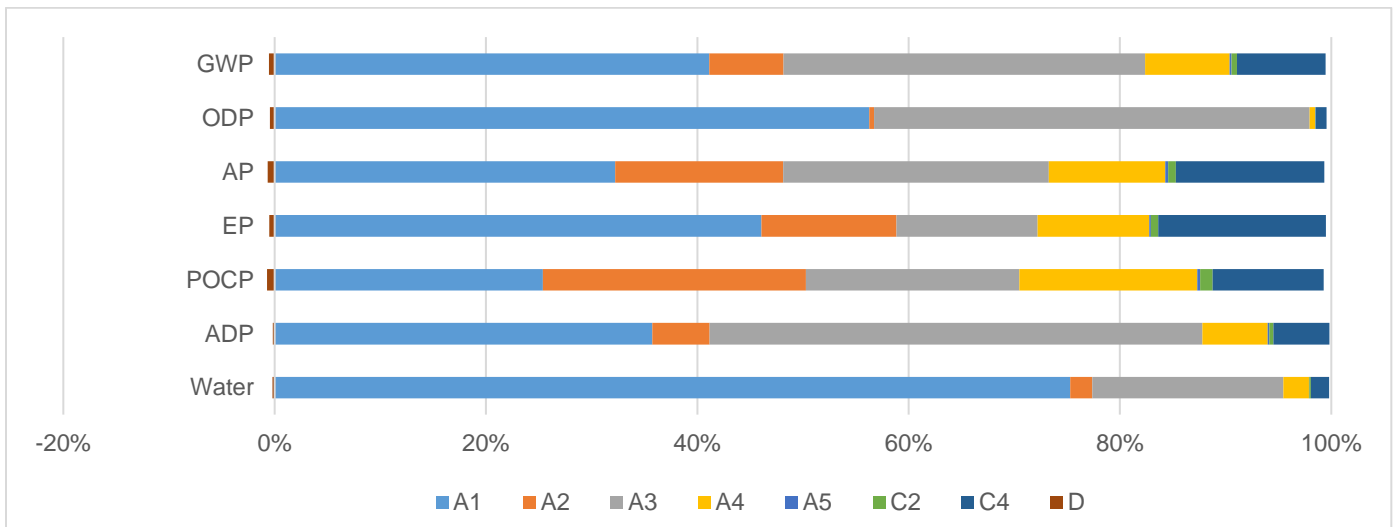


Figure 2: A1-D breakdown of selected results for ready mixed, lightweight, 3.5 gal pail

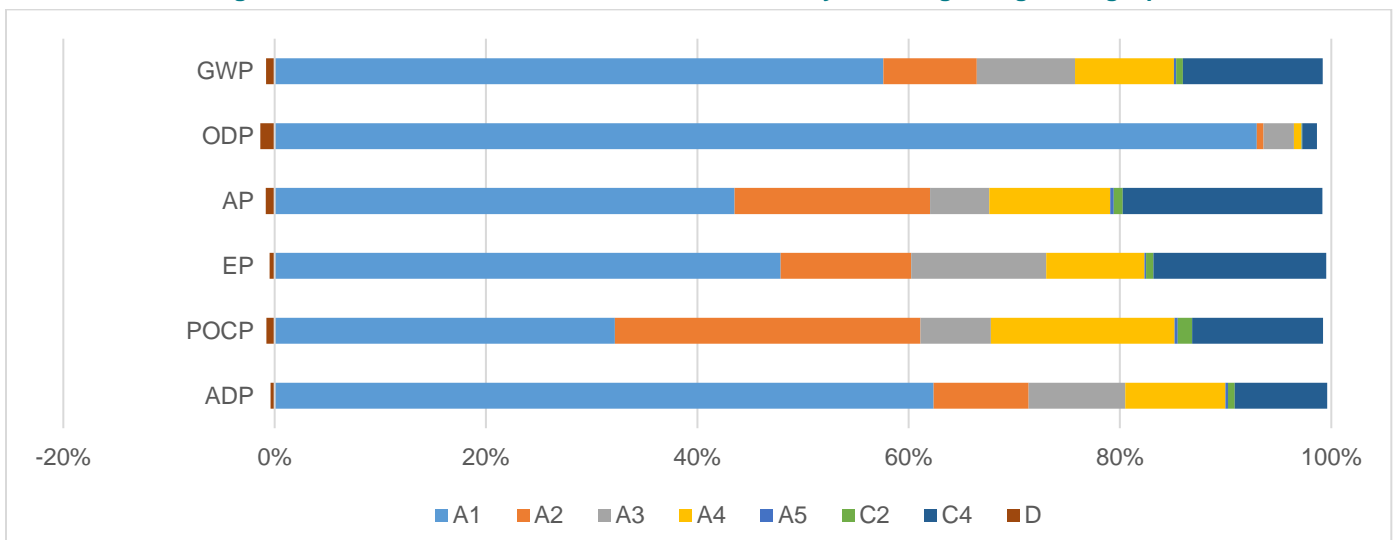


Figure 3: A1-D breakdown of selected results for ready mixed, lightweight, 3.5 gal cardboard





JOINT COMPOUND  
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## LCA Development

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